G. R. S. 59] GFB—15,000 20-12-13

GENERAL AND REVENUE SECRETARIAT.

1912-13
(Genl. Misc.) p60

File No. 216 - 12.

Serial Nos. 1 - 26

Papers Filed.

Month April 1914

SUBJECT.

Invention for 'Improvements in the treatment of Refractory Gold and Silver ores' by Mr Charles Butters of London

PREVIOUS REFERENCES.	LATER REFERENCES.

K. N. Krishnaswami — 15.5.14

G.R.S. 11] 1912-13

GENERAL AND REVENUE SECRETARIAT.

(Gen: mis)

NOTES.

Gen. File No. 216 12/13

FILE HEADING.

Invention for "Improvements in the treatment of Refractory Gold and Silver ores" by Mr. Charles Butters of 54, New Broad Street, London, England.

From

Messrs Remfry and Son, Calcutta.

No. Dated 27. 11. 12 Received 2. 12. 12

Diary No. 2902	Enclos. 2 & Rs 11 Spare Copies. -	Serial No. /

BRIEF ABSTRACT OF LETTER.

Forwards an applⁿ for leave to file a specifⁿ of the above invention and ~~also~~ a Power-of-Attorney and also Rs 11/- towards the fee and stamp respectively.

NOTES AND ORDERS.

1 The inventor says that a corresponding application was made in Great Britain in August 1912

2 The usual drafts are subd.

S/499 7.12.12 VS ... 3 Issue M 7.12.12

NOTES—First Sheet.

GPB—30,000—12-8-11

R. S. 12]

General and Revenue Secretariat.

G. M. File No. 216 of 1912-3.

G3159

Serial No.	
2.	To. The State Geolgist G. 3245 d/ 13-12-12. Forwards for report the application received with the above
3.	To. The Supdt of Stamps G. 3246 d/13.12.12 Forwards Re 1- and the power-of-attorney received with sl 1 & requests that the power may be impressed with the Stamp of the value of one rupee.
4.	To. The D. C. Dry Dept. Bangalore. G. 3247 d/13.12.12. Forwards Rs 10/- received with sl 1 and requests an acknowledgment.
5.	To Messrs Remfry & Son. Calcutta G. 3248 d/13.12.12. With reference to sl 1, requests that an authenticated copy of the orders passed on the corresponding application stated to have been made in Great Britain, may be furnished.
6	From the Supdt of Stamps. No. 82 d/ 16th Dec. 1912. Returns duly stamped the Power-of-attorney forwarded with sl 3 & requests acknowledgment. 4 Draft acknowledging is subd.

G 1499 WL
19.12.12.

Draft approved by W.S. may issue

WL
21-12-12

NOTE—Contn. sheet.

GPB—65,000—17-6-12.

R. S. 12]

General and Revenue Secretariat.

G. R. File No. 216 of 1912-13.

Serial No.	
7.	To the Supt. of Stamps, Nr. G. 3466/30.12.12— Acknowledges the receipt of the duly stamped Power of Attorney forwarded with the above
8	From the D.C. Dry Dpkt, Bangalore. Nr. 130 & 16.12.12 Acknowledges the receipt of the amount forwarded with Sl. 4.
9	From the State Geologist. Nr. 480 & 23.12.12. Returns with his opinion the specifn forwarded with Sl 2. Subd with a draft in accordance with the State Geologist's opinion. Sl 99 3.1.13 Issue 4.1.13
10.	To Messrs. Remfry & Son. Calcutta G. 3729 & 10.1.13. Makes certain suggestions and observations in connection with the specification received with Sl 1, and returns the specification for needful alteration.
11	From Messrs Remfry & Son, Calcutta. dated 2.10.13. With refce to the above, resubmits the applcn after embodying therein claims agreeing with the claims of the British Complete Specification which has been accepted, and request the filing of the Specn. Draft forwarding the same to the State Geologist is subd Sl 31.1.13 Issue 4.2.13.

Sus

NOTE—Contn. sheet.

GPB—65,000—17-6-12.

R. S. 12]

General and Revenue Secretariat.

File No. 216 of 1912-13

4145
5363

Serial No.	
12	To the State Geologist. No. G. 4397 & 11. 12. 13 with refce to sl 9, retransmits the applr embodying therein claims agreeing with those of the British Complete Specification, and requests to be informed if the leave applied for for filing the Specification may be granted
13	From the same. No. 1468 & 20-12-13. With reference to the above, reports that the leave applied for may be granted. The usual drafts are subd 15/1/14 hm Issue 16.1.14
14	Govt order: No. G. 565 & 26. 1. 14 Authorises the applt Mr. Charles Brothers of London to file an amended specification for the invention refd to in the Correa.
15	To Messrs Remfry & Son Calcutta. No. G. 565 & 26. 1. 14 Forwards the G.O. (sl 14) & requests that the same may be communicated to the parties concerned.
16	From Messrs Remfry & Son. letter & 27. 1. 14 Forward Rs 30/- and 4 copies of the specification and request the filing of the specification. The amount has been received. The usual drafts are subd. The certificate at foot of the G.O (draft and fair) requires signature. 10/2/14 hm 11. 2. 14

Flag L

NOTE—Contn. sheet.

GPE—65,000—17-6-12.

G. R. S. 12]

General and Revenue Secretariat. | Gen File No. 216 of 1912.

6035
6141
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3271

Serial No.	
17	To the Compiler, Mysore Gazette. No. Cs 6667 & 20 2. 14
	Notifies the filing of the Specifn.
18	To Messrs Remfry & Son. No. Cs 6668 & 20 2. 14.
	With refce to Sl 16, forwards copy of the above & returns
19	To D.C. Treasury, Bangalore. No. Cs 6669 & 20 2. 14
	Forwards the amount recd with Sl 16.
20	To the State Geologist, Supdt, Govt Museum & Chief Engineer. No. Cs 6670-2 & 20 2. 14.
	Forwards for record copy of the Specifn.
21	From D.C. Trs, Bangalore. No 1043 & 21. 2. 14
	Acknowledges the receipt of the amount forwarded with Sl 19.
22	From the Supdt, Govt Museum. No 142 & 24. 2. 1914
23	Do — State Geologist. No 1973 & 26. 2. 14
	Acknowledge the receipt of the specifn forwarded with Sl 20.
24	From Messrs Remfry & Son & 25. 2. 14
	Request the return of the £0 (Sl 14) with the Certificate at foot thereof duly filled in & Signed.
Flag A	Draft forwarding the £0 is submd. The Certificate at foot of the £0 has been already filled in and signed.
	9/3/14
	W/3
	12.3.14
25	To Messrs Remfry & Son. No Cs 7689 & 20. 3. 14
	Returns the Certificate as requested in the above.

NOTE—Contn. sheet.

GPB—60,000—7-11-13

G. R. S. 12]

General and Revenue Secretariat.

GRC File No. 216 of 1912.

Serial No.	
26	From the Chief Engr. No 400/2270 dtd 9. 2.14 Acknowledges the receipt of the Specification forwarded with DL 20. The correc may now be filed. Subd GA 25.4.14 TBR

6584

1615

NOTE—Contn. sheet.

GPB—60,000—7-11-13

GENERAL. V 9A 2/12 HW

0.2902

12-13.

(1)

for: mis

216-05-19128

REGD.

To

THE ~~PATENT~~ SECRETARY, TO THE GOVERNMENT OF MYSORE,
~~PATENT OFFICE~~, Genl. & REV. DEPTS.
~~CALCUTTA~~. BANGALORE,
MYSORE

FROM

REMFRY & SON,
SOLICITORS AND PATENT AGENTS,
CALCUTTA.

Dated CALCUTTA, the 27th November 1912.

Sir,

Dept. P. File Ln. M.
FILE INDICATION.
Mysore Pats.

re C.BUTTERS. (MYSORE).

We have the honour to forward herewith an Application of CHARLES BUTTERS, of 54 New Broad Street, London, England, Metallurgist, an Inventor, for leave to file a Specification under Part I of the Mysore Inventions & Designs Regulation, 1894, in respect of an Invention for "IMPROVEMENTS IN THE "TREATMENT OF REFRACTORY GOLD AND SILVER ORES", and solicit the favour of your submitting the same to H.H.the Dewan.

The Power of Attorney under which we are acting is also enclosed and we solicit the favour of your having same stamped Re 1/-.

The corresponding British Application is No. 18661 dated 14th August 1912 and we believe there is no corresponding Application in India.

A Post Office Order for Rs11/- is sent today.

We have the honour to be,
Sir,
Your very obedient servants,

REMFRY & SON

MYSORE APPLN.

A.M.

1,000.—17-3-11.

FORM 7.

(1) (2)

SPECIFICATION.

TO ALL WHOM IT MAY CONCERN :

BE IT KNOWN that I, Charles Butters, of 54 New Broad Street, London, England , Metallurgist, am in possession of an invention for "Improvements in the Treatment of Refractory Gold and Silver Ores": and I, the said Charles Butters, do hereby declare the nature of my said invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof, that is to say:-

SOLICITORS & PATENT AGENTS
RAMPRY & SON
CHANCERY LANE

3

This invention relates to improvements in the treatment of refractory gold and silver ores.

The object of the invention is the decomposition of the metallic compounds of gold and silver in the ores by the reaction on them of caustic alkali when the ore is in contact with a certain metal for instance metallic aluminium or an alloy of same, whereby the valuable metals are left in such a physical condition that later on they may be dissolved by a dilute solution of cyanide of potassium or other suitable solvents.

Of the other metals than aluminium, zinc and palladium may be mentioned.

It has been found that if sulphuret, telluride or arsenical gold and silver ores whether associated or not associated with antimony and the like, are acted on as hereinafter described by an electric current in the presence of caustic soda or other caustic alkali such ores are decomposed, and the metallic gold and silver are freed from combination with the sulphur, arsenic, or the like, and are thus in a condition to be readily attacked by the desired solvents.

It will be appreciated from the above and the description following, of a manner of carrying out the invention, that it differs from suggestions for the treatment of ground telluride and like ores for the electrolytic decomposition by metallic contact is present, as in this case but where the solvent action of

(4)

a relatively strong caustic alkali solution is employed with a separate precipitation of tellurium from the filtrate by protochloride of tin, or where only the ore is treated to the solvent action of polysulphides of the alkalies under heat and pressure, or where again the recovery of antimony from ores is effected by the solvent action of a relatively strong caustic alkali solution, aluminium being used in a secondary process for recovering the antimony from the solution of the first process, but such aluminium not being present in the ore pulp simultaneously to effect electrolytic decomposition. It also differs from known processes of precipitating precious metals from cyanide solutions by aluminium in the presence of free alkalies or earthy alkalies, or the precipitation of precious metals by aluminium from sulphurized solutions containing free alkali that is to say solutions containing gold in the form of sulphuret or hyposulphide of gold, the present invention not dealing in the first instance with solutions of precious metals but with the ores of such metals.

It is believed that the most economical and satisfactory method of utilizing the present invention is to agitate an extremely finely ground ore of the character referred to, made into a pulp with water in which a sufficient amount of caustic soda or other caustic alkali has been dissolved to form a suitable electrolyte: in vessels containing blocks plates or the like of aluminium or alloys of aluminium or formed

(5)

of or lined with ore. Under these conditions an electrical current is set up between the aluminium and ore it is desired to decompose, the aluminium acting as the anode and the said ore as the cathode, which latter, probably principally through the agency of nascent hydrogen, is then split up into its component parts, and the precious metals left free to be acted on by cyanide or other suitable solvents.

If desired an independent cathode, separate and distinct from the ore may be used, of some metal other than aluminium, for instance iron. In this case contact between the independent cathode and the aluminium within the electrolyte is avoided, but the aluminium and independent cathode are connected outside the electrolyte by means of a connecting wire or other suitable device. In this case an electric current will flow from the aluminium to the iron within the electrolyte and any particles of the precious refractory minerals which may be in contact with the iron plate will be split up in the same manner as they are when such minerals are themselves used as cathodes. In practice, however, I find it more convenient to make such mineral particles themselves constitute the cathode of the electrolyte couple.

Of the base constituents of the ore, in the case of sulphur a soluble sulphide is formed, but in most of the other instances, for example arsenic

(6)

and antimony, the caustic solution used is so weak that only very small amounts are capable of being dissolved during the short time of contact. In any case it is immaterial to this process whether such base constituents combine with or dissolve in the electrolyte or whether they remain alloyed with the ore in the elemental state, the only point of importance being to separate them from the precious metals, which in fact occurs as the result of this process.

The following equations will serve as examples to illustrate the reactions involved in this process:

A. Argentite (Ag_2S)

$$3Ag_2S + 2Al + 4NaOH = Na_2Al_2O_4 + 3Na_2S + 2Al_2S + 6Ag.$$

Of course, since there is always an excess of caustic alkali present, the Al_2S is immediately transformed into sodium sulphide as follows:-

$$Al_2S + 8NaOH = 3Na_2S + 2Al_2O$$

B. Proustite (Ag_3AsS_3)

$$Ag_3AsS_3 + 2Al + 4NaOH = Na_2Al_2O_4 + 2Na_2S + AlNa_3 +$$

$$3Ag + As$$

In this case some of the arsenic goes into

solution in the excess of caustic alkali, but most of this will be precipitated out again by the aluminium if the treatment is continued long enough. For purposes of the subsequent cyanide treatment it is immaterial which of the two courses is followed by the arsenic.

C. Pyrargyrite (Ag_3SbS_3)

$$Ag_3SbS_3 + 2Al + 4NaOH = Na_2Al_2O_4 + 2H_2S + Na_2S + 3Ag + Sb$$

The same remark will hold good here as applies above in the case of arsenic.

D. Gold telluride, say ($AuTe_2$)

$$AuTe_2 + 2Al + 4NaOH = Na_2Al_2O_4 + Na_2Te + 2H_2Te + Au.$$

A convenient way of carrying out the invention is to mix to a fluid pulp the finely ground ore with a caustic soda solution of say about three-tenths per cent. (say 0.3%) strength and pass the same continuously at a suitable rate of speed through a revolving cylinder or similar device containing a suitable quantity of metallic aluminium, or alloy of aluminium, in the form of blocks, plates or granules, the pulp after passing through the said cylinder being collected in a tank or other receptacle in which blocks or plates of metallic

aluminium are placed in such a way as to give the best contact between their surfaces and the pulp, agitation being maintained in this tank until the refractory minerals are sufficiently decomposed for purposes of the subsequent treatment for extraction of the precious metals.

In some cases the passing of the pulp through the cylinder may be found sufficient without the further contact in the tank, and in others the tank treatment alone may be given.

The presence of the metallic aluminium at the time the ore is being acted on by the caustic soda, results, as I have found by experiment, in permitting the use of soda solution of much less strength than it is possible to use with the aluminium absent, because of the electrolytic decomposition effected in the presence of the aluminium. This is of great importance in that the regeneration of the soda solution after the decomposition of the ores under certain circumstances may be expensive. With the weak solution the use of which is rendered possible by this process, such solution may be allowed to waste. Furthermore by my process, I am enabled to work at atmospheric temperatures and pressures.

When the minerals are sufficiently decomposed which may be ascertained by sampling the ore may be withdrawn from the tank or cylinder and separated

(9)

from the caustic soda solution by filter-pressing or otherwise, with or without washing of the cake, and the gold and silver, which by the action of the process is now only mechanically held in the residue, extracted and recovered from such residue by any suitable means, such as by treatment by the well known cyanide process to extract the gold and silver which may be then recovered from the solution in any desired way.

Having now particularly described and ascertained the nature of this said invention and in what manner the same is to be performed, I declare that what I claim is:-

1. The process of treating refractory gold and silver ores containing in subjecting the ores to the action of caustic alkali in the presence of a suitable metal for example metallic aluminium or an alloy of same substantially as and for the purposes described.

2. The process of treating refractory gold and silver ores as claimed in the preceding claim in which the caustic alkali is in solution and the metallic content is extracted with mercury substantially as and for the purposes described.

3. The process of treating refractory gold and silver ores as claimed in claim 1, in which electrolytic dissolution of such ores is effected by the use of an anode of metal for example aluminium or of an alloy of same and an electrolyte of a solution of caustic alkali substantially as and for the purposes described.

4. The combined process of treating refractory gold and silver ores containing an antimonial as claimed in any of the preceding claims together with the subjection of the residues after the separation

of the alkali solution to the action of a suitable solvent to extract the precious metal.

Dated this day of October, 1912.

COUPON. The remitter may write here any communication to

Re 11 ...re C. BUTTERS. (Mysore)
Application.

REMFRY & SON

1/27/11/12

12

G

To B. E

4/1/12

G.R.S. 29A]

13

19

From

Secy. to the Govt. of His Highness
The Maharaja of Mysore,
Genl. and Rev. Dept.

To

The State Geologist
in Mysore

Dated

Despatched 13.12.12

Received

General No. G. 3245

No. G.M. 216-12-2

Enclosure No. 1

Has the honor to forward herewith for report under Sec 6(2) of the Mysore Inventions and Designs Regulation No. XI of 1894 an application for leave to file a Specification of an invention for "Improvements in the treatment of Refractory gold and silver ores" by Mr. Charles Butters of ~~No~~ 54, New Broad Street, England, (London.

By order,

13.12.12
For Secretary

GPB—20,000—24-10-10.

16/12

Money & Cover sent
16/12/12

4

G.R.S. 29A]

19 (14)

From

Secy. to the Govt. of His Highness
The Maharaja of Mysore,
Genl. and Rev. Dept.

To

The Superintendent
of Stamps, Bangalore.

Dated

Despatched 13-12-12

Received

General No. C. 3246

No. C.R.-216-12-3.

Enclosure No. with Rupees one and the Power of Attorney

Has the honor to forward herewith a power-of-attorney executed by Mr. Charles Butters of 54, New Broad Street, London, England, constituting Messrs Rempfry & Son as Agents in respect of his invention for "Improvements in the treatment of Refractory gold and silver ores", and to request that the power may be impressed with the general Mysore stamp of the value of Re one herewith forwarded, and the same returned to this Office.

By Order,

7.12.12

Dep. Asst. Secretary

GPB—20,000—24-10-10.

VS

Money & Cover rec'd
16/12/12

4

G.R.S. 29A]

(15)

19

From

Secy. to the Govt. of His Highness
The Maharaja of Mysore,
Genl. and Rev. Dept.

To

The Deputy Comm.r,
Treasury Dépôt,
Bangalore Dt

Dated

Despatched 13th Dec 1912

Received

General No. G.3247

No. G.M-216-12-4

Enclosure No. with Rs 10.

Has the honor to forward herewith a sum of Rs 10/- received from messrs Rempry & Son, Calcutta being the application fee payable under Schedule IV cl (1) of the Mysore Inventions and Designs Regulation No. XI of 1894 for leave to file a specification of an invention for "Improvements in the treatment of refractory gold and silver ores by Mr Charles Butters of 54, New Road St, London, and to request the favor of an acknowledgment for the receipt of the amount

By Order,

GPB—20,000—24-10-10.

7.12.12

For the Secretary

VS

11/12

(16)

G.R.S. 26]

Q

4 ?6

for File No. 216-12

Serial No. 53

Diary No. of letter replied to 2902

No. G. 3248

General and Revenue Secretariat

( )

, the 19

To

Messrs Remfry and Son,

Solicitors & Patent Agents,

Calcutta

Date of issue 13-12-12

Signed by Mr. B. Ramaswamia

Gentlemen,

With reference to your letter (appln) dated the 27th Nov. 1912, for leave to file a specification of an invention for "Improvements in the treatment of Refractory gold and silver ores" by Mr Charles Butters of 54, New Broad St, London, I am directed to

over.

SUBJECT.

(7)

request that an authenticated copy of the orders passed on the corresponding application stated to have been made in ~~British~~ Great Britain may be furnished.

I have &c.,

7.12.12

for the Secretary.

VS

List of enclosures,

Copied by

Examined by

GPB—20,000—25-9-10

3159 V 17/12 191

12-13 From

Jan: Mis

246 of 1912-13

6 To "The Offg. Secretary to the Govt. of His Highness the Maharaja of Mysore Govt. Revl. Dept. Bangalore

Dated 16

Despatched

Received December 12

General No. 82

No..

Enclosure No. one stamped Power of attorney

His Letter / Docket No. G.3246 Gen 246-12-3

Dated 13/12/12 rec'd to-day.

Has the honor to return herewith duly stamped the Power of attorney received with the above, and to request the favor of an acknowledgment.

Superintendent of Stamps
in Mysore.

GPE—500—27-7-1

FORM 5.

GOVERNMENT OF MYSORE 1 RUPEE

DEC 16 1912 REVENUE STAMP

POWER OF ATTORNEY.

(19)

IN THE MATTER of the Inventions and Designs Regulation XI of 1894, of the Government of Mysore:

and

IN THE MATTER of Charles Butters, of 54 New Broad Street, London, England, Metallurgist, an Inventor.

I, the above named, Charles Butters, do hereby retain, constitute and appoint the partner or partners for the time being of the firm of REMFRY & SON of Calcutta, British India, Solicitors and Patent Agents, as my Agents and Attorneys to apply for and obtain from the Government of Mysore an Exclusive Privilege for "Improvements in the Treatment of Refractory Gold "and Silver Ores", and to maintain the same in force: and I authorize them to sign my name to such papers and writings and do such acts regarding the same, including substitution and revocation, as may be necessary or expedient. And lastly, I request that all notices, requisitions and communications now or hereafter relating to the same may be sent to such Agent at the above address, and that they be recognized as my authorized Agents. in all proceedings incident thereto.

SOLICITORS & PATENT AGENTS REMFRY & SON.

Dated this tenth day of October, 1912.

Charles Butters

Signed, Sealed, and Delivered by the above named Chares Butters at London, England, in the presence of:-

Thomas James Walker.

George Percy Skelsey

G.R.S. 29A]

19 (20)

From

Secy. to the Govt. of His Highness
The Maharaja of Mysore,
Genl. and Rev. Dept.

To

The Superintendent
of Stamps,

Dated Bangalore

Despatched 30-12-12

Received

General No. G. 3466.

No. G.M. 216-12-7

Enclosure No. —

Has the honor to acknowledge the receipt of the duly stamped Power-of-attorney forwarded with ~~your letter~~ his docket No. 82 dated the 16th December 1912

By order,

27.12.12

for the Secretary

NR

GPB—20,000—24-10-10.

C Staff 28/IV

(21)

No. 3180

1912
Jan. - 1913

Book No. 1041

Rs 10-0-0 No 897/30

Bangalore Treasury dated 16-12-12

Received from the Obligee to the Govt. of H. H. the Maharaja of Mysore Rs. 216 Nil - 12

Rupees Ten

Annas Nil and Pies Nil being on account of

Application fee in respect of an invention by mr Charles Butler

Vide docket no. 3247 of 13-12-12

of Sr. 216-12-4

In charge of Treasury.

Bangalore

Noted and returned

To B & V

19.12.12

24/12

(22)

M.G.D. 13]

MYSORE GEOLOGICAL DEPARTMENT,

DATED BANGALORE, 23 Dec 1912.

24/12/12

No. 1480 - Ene. 1

DIARY No. 3272

1912-1913
EDITION for: mis
FILE No. 216 of 1912-13

From

DR. W. F. SMEETH, M.A., D.SC., A.R.S.M., etc.,
State Geologist in Mysore.

To

K.R.Sreenivasa Iyengar, Esquire, M.A.,
Offg. Secretary to Government,
General and Revenue Departments,
Bangalore.

Sir,

In reply to your docket No.G.3245/G.M.216-12-2, dated 13th December 1912, about Mr. Charles Butters' invention for improvement in treatment of Refractory gold and silver ores, I have the honour to state as follows:-

1. The process specified appears to be novel in intention, but some of the claims have an unnecessarily wide extension and should, in my opinion, be modified.

2. Claim 1 would apply to the treatment of an ore in any metallic agitator or even in a metallic vat provided an alkali is present and would apply to a good deal of plant at present in use for cyanide treatment.

This claim should be modified so as to exclude such cases or the nature or properties of the metal or the class of reaction which is to occur should be specified.

3.

G.P.B.—400—21-6-13

23

3. The same objection applies to claims 4, 5, 8 and 9.

4. In the remaining claims the expression - "a metal having the properties for the required reaction of aluminium &c. - " is used and is not very clear. Does it mean that the metal used must have a certain reaction which is given by aluminium, zinc &c.? If so, it is desirable that the required reaction should be more clearly specified and it is suggested that this might be done in the first claim and referred to thereafter as the "required reaction".

5. With these suggestions the papers are returned for alterations and remarks by the applicant.

I have the honour to be,

Sir,

Your most obedient servant

W. Smeeth

State Geologist in Mysore.

C.M.

(G.R.S. 26]

File No. 216-12

Serial No. 10

Diary No. of letter replied to 3272

No. G. 3729

(Co.1)

General and Revenue Secretariat

( )

, *the* 19

To

Messrs Remfry & Son,

Solicitors & Patent Agents, Calcutta

Date of issue 10-1-13

Gentlemen,

Signed by Mr. B. Ramaswamia

In reply to your letter dated the 27th Nov. 1912, applying for leave to file a specification of an invention for "Improvements in the treatment of refractory gold and silver ores" by Mr. Charles Butters of 54, New Broad Street, London, I am directed to observe as follows:—

1. The process specified appears

over.

SUBJECT.

to be novel in intention, but some of the claims have an unnecessarily wide extension and require to be modified.

2 Claim 1 would apply to the treatment of an ore in any metallic agitator or even in a metallic vat provided an alkali is present and would apply to a good deal of plant at present in use for cyanide treatment.

This claim should be modified so as to exclude such cases or the nature or properties of the metal or the class of reaction which is to occur should be specified.

3 The same objection ~~holds~~ applies to claims 4, 5, 8 & 9.

4 In the remaining claims, the expression "a metal having the properties for the required reaction of aluminium &c is used, which is not very clear. Does it mean that the metal used must have a certain reaction which is given by aluminium, zinc &c? If so, it is desirable that the required reaction should be

List of enclosures,

Copied by

Examined by

GPB—20,030—26-9-10

G.R.S. 27]

GENERAL AND REVENUE SECRETARIAT.

(*Continuation Sheet draft form.*)

more clearly specified, and it is suggested that this might be done in the 1st claim and referred to thereafter as the required reaction.

With these suggestions and observations, the specification is returned for the needful alteration.

I have &c,

for
4.1.13

for the Secretary

NR

GPB—10,000—22-2-11

GENERAL.

(27)

REGISTERED.

To

THE ~~PATENT~~ SECRETARY, TO THE GOVERNMENT OF MYSORE,
~~PATENT OFFICE,~~ GENL & REV. DEPTS.,
~~CALCUTTA.~~ BANGALORE,

FROM MYSORE.

REMFRY & SON,
SOLICITORS AND PATENT AGENTS,
CALCUTTA.

DIARY No. 2496
1913-1914
Sir
SECTION Gen: Mis
No. 216 of 1912-13
No. 11

Dated CALCUTTA, the 2nd October 1913.

Dept. P. File Ln. M.
FILE INDICATION.
Mysore Pats.

re C. BUTTERS. (MYSORE)

In this matter, we beg to resubmit herewith the Application after embodying therein Claims agreeing with the Claims of British Complete Specification No. 18660/12 and altering the reference to British No. 18661/12 on Page 1 to No. 18660/12.

We may state that 2 British Provisional Specifications were filed under Nos. 18660/12 & 18661/12 and that subsequently one British Complete Specification was filed which has been duly "accepted" under No. 18660/12 as will appear on reference to the Certified Copy British Specification No. 18660/12 sent herewith.

We solicit the favour of early Orders on this Application.

We have the honour to be,

Sir,

Your very obedient servants,

REMFRY & SON

Enclos.

(1) C/Copy Brit.P/Specn 18660/12
(2) Mysore Appln.
(3) Cancelled Claims.

I.M.B.

100.—17-3-11.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:-

1. The process of treating refractory gold and silver ores consisting in subjecting the ore to the action of a metal in the presence of a suitable alkali.

2. The process of treating refractory gold and silver ores consisting in subjecting the ore in the presence of a metal having the property for the required reaction of aluminium, zinc, tin, or palladium, to the action of a suitable alkali.

3. The process of treating refractory gold and silver ores consisting in subjecting the ore to the action of metallic aluminium or an alloy of same in the presence of a caustic alkali solution.

4. The process of treating refractory gold and silver ores consisting in subjecting the ore to the action of a metal by agitation in the presence of a suitable alkali.

5. The process of treating refractory gold and silver ores consisting in subjecting crushed ore to the action of a metal in the presence of a suitable alkali and subsequently subjecting the residue after separation from the alkaline solution to the action of a solvent to extract the precious metal

6. The process of treating refractory gold and silver ores consisting in subjecting crushed ore to the action of a metal having the property for the required reaction of aluminium, zinc, tin or palladium, in the presence of a suitable alkali and subsequently subjecting the residue after separation from the alkaline solution to the action of a solvent to extract the precious metal.

7. The process of treating refractory gold and silver ores consisting in subjecting crushed ore with agitation to the action of a metal having the property for the required reaction of aluminium, zinc, tin or palladium, in the presence of caustic alkali and subsequently subjecting the residue after separation from the alkaline solution to the action of a solvent to extract the precious metal.

8. The process of treating refractory gold and silver ores consisting in subjecting crushed ore in the presence of a solution of a suitable alkali to the action of metal surfaces combined with agitation by means of surfaces of the same metal, and subsequently subjecting the residue after separation from the alkaline solution to the action of a cyanide solution to extract the precious metal.

9. The process of treating refractory gold and silver ores consisting in crushing the ore in the presence of a solution of a suitable alkali, then agitating the ore with sufficient of the solution to form a thick pulp in the presence of a metal, then extracting the decomposed

residue from the alkaline solution, and then subjecting such residue to the action of a solvent to extract the precious metal.

10. The process of treating refractory gold and silver ores consisting in crushing the ore in the presence of a solution of a suitable alkali, then agitating the ore with sufficient of the solution to form a thick pulp in the presence of a metal having the properties for the required reaction of aluminium, zinc, tin or palladium, then filter pressing the decomposed residue to extract it from the alkaline solution, and then subjecting such residue to the action of a solvent to extract the precious metal.

11. The process of treating refractory gold and silver ores consisting in crushing the ore in the presence of a solution of a suitable alkali, then agitating the ore with sufficient of the solution to form a thick pulp in the presence of fixed and moving surfaces of a metal having the properties for the required reaction of aluminium, zinc, tin or palladium, then extracting the decomposed residue from the alkaline solution, then subjecting such residue to the action of a solvent to extract the precious metal, and then precipitating the latter.

(87)

G. R. S. 26]

5/12 2696

Diary No. of letter replied to ——

fm File No. 216-12

Serial No. 12

No. 6489

General and Revenue Secretariat

( )

, *the* *191*

Date of issue 14/12/13

Signed by Krishnaswamy Q

To

The State Geologist in Mysore.

Sir,

With refce to your letter No. 1480, dated the 28th December 1912, reporting in the matter of Mr. Charles Butters' invention for "Improvements in the treatment of Refractory Gold and Silver Ores," I am directed to ~~transmit~~ retransmit herewith the application received from Messrs Rempfry & Son, Calcutta, after embodying therein claims agreeing with those of the British Complete Specification

over.

SUBJECT.

(12)

No. 8660/12 (also herein enclosed)

and to request to be informed whether

under the circs, the leave applied

for for filing the said ~~application~~ specification

may be granted.

I have &c,

4.12.13.

For Secretary

BR

List of enclosures.

Copied by

Examined by

GPB—25,000—5-8-11.

33

M.G.D. 13]

MYSORE GEOLOGICAL DEPARTMENT

DATED BANGALORE, 20 December 1913.

No. 1468

DIARY No. 4145

1913-1914
SECTION
FILE No. 216 of 1913-14
SERIAL No. 13

FROM

DR. W. F. SMEETH, M.A., D.Sc., A.R.S.M., etc.,
State Geologist in Mysore.

SIR

TO

K.R. Srinivasa Iyengar, Esquire, M.A.,
Secretary to the Government of His Highness
the Maharaja of Mysore, General & Revenue Depts.,
Bangalore.

SIR,

In reply to your letter No. G 4397/G.M.216-13, dated the 11th December 1913, retransmitting for my opinion, Mr. Charles Butters' amended application for leave to file a specification of an invention for "Improvements in the treatment of refractory gold and silver ores", I have the honour to inform you that in my opinion the leave applied for may now be granted.

2. In future when reference is made to a previous specification I shall be ~~glad~~ obliged if the papers so referred to or connected are kindly forwarded for reference, as we do not

not keep up copies of the specifications which are returned to the General Department.

3. The enclosures to your letter under reply are herewith returned.

I have the honour to be,

Sir,

Your most obedient servant,

State Geologist in Mysore.

FORM 6a.

Ref 912 2 c6

35

APPLICATION.

To the DEWAN of MYSORE.

The Application of Charles Butters, of 54 New Broad Street, London, England, Metallurgist, for Leave to file a Specification under Part I of The Inventions and Designs Regulation 1894.

1. The Applicant is in possession of an invention for "Improvements in the Treatment of "Refractory Gold and Silver Ores": he is the inventor thereof: and to the best of his information and belief, the invention is new within the meaning of Part I of The Inventions and Designs Regulation, 1894; and no circumstance exists which, if the Applicant be authorized to file a Specification and files it in accordance with that Part will disentitle him to an Exclusive Privilege thereunder in respect of the invention for which an Application for a Patent was filed in Great Britain under No. 18660 of 1912, on the 14th of August, 1912: see Illustrated Official Journal (Patents), August 21st, 1912, page 1147.

2. The following is a description of the invention:-

SOLICITORS PATENT AGENTS REMFRY & SON. CALCUTTA

This invention relates to improvements in the treatment of refractory gold and silver ores.

The object of the invention is the treatment of refractory gold and silver ores to render them readily amenable to treatment by cyanide solutions or by any other processes for extraction of the precious metals thereof. As a result of the process in question, a higher extraction is obtained, time is saved, and so is also the cyanide or other solvent which may be employed in the final recovery of the precious metal.

It has been found by experiments that when sulphide telluride and similar silver and gold ores associated with or not associated with arsenic, antimony, bismuth, selenium, and the like, are brought into intimate contact, such as by agitation, or otherwise, with certain metals in any convenient form but preferably metallic surfaces, in the presence of caustic soda or other suitable alkalies, either hot or cold, such ores are decomposed, and the metallic silver and gold are freed from combination with the sulphur or the like and are then in a condition to be readily attacked and dissolved by potassium cyanide or other suitable solvents.

The metals which appear to give the best results are aluminium, and any aluminium alloy, zinc, tin, and palladium, or suitable alloys of these but the invention is not confined to these particular metals as other metals may be used which react under the conditions specified.

A convenient way of carrying out the first part of

the invention is to bring the ore in a more or less finely divided state while circulating in the alkaline solution in contact with the aluminium, or an aluminium alloy, whereby a slight electrical current is generated causing a decomposition of the compounds of silver and gold (in combination with the sulphur, tellurium, selenium, arsenic, antimony, bismuth, or the like) into their respective elements, the chemical change taking place being apparently that in the following equation:-

$$Ag_2S+2\ Al+4\ NaOH=Na_2Al_2O_4+Na_2S+2\ Ag+4\ H.$$

The explanation appears to be as follows:-

Silver or gold sulphide, telluride, etcetera, for example, in contact with aluminium, for example, in an alkaline solution has its silver or gold set free, the sulphur or the like uniting with the sodium of the alkaline solution forming sodium sulphide, and the aluminium going into the solution to form sodium aluminate while the hydrogen is given off as a gas.

From the theoretical point of view the reduction of silver sulphides in, for example, an alkaline solution with the aid of aluminium, should take place in accordance with the following equation:-

$$3Ag_2S+Al_2+8\ NaOH = 3\ Ag_2+Na_2Al_2O_4 + 3\ Na_2S+4\ H_2O:$$

but probably owing to the different conditions of actual practice the reaction may be more that expressed in the first given equation.

The silver or gold being in the free state and in a spongy mass is readily dissolved by cyanogen compounds or other solvents.

When the ore is decomposed it may be separated from the caustic soda by filter pressing or otherwise and the silver and gold, which by the action of the process is now only mechanically combined with the residue, extracted and recovered from such residue by any suitable means.

An example of a complete process for the recovery of gold or silver from the ore is as follows:-

The ore is first finely crushed or ground in the presence of a solution of caustic soda or other suitable alkali and the solution with the ore is then run into tanks from which firstly the excess of the solution may be decanted. The ore with sufficient solution to form a thick pulp is then agitated in such tank, or it may be in a separate tank if the first is not provided with an agitator. Or it may be agitated in a cylinder like a tube mill, or in any efficient manner to bring all the particles in contact with the aluminium or other metal or alloy employed. Such agitating vessel may be lined with one of the metals referred to, say aluminium, or aluminium alloy, or it may contain or carry balls, blocks, or plates of the metal, the agitating element or beaters being also preferably of the same metal, viz: aluminium, or aluminium alloy. From time to time the pulp is sampled and when decomposition is sufficiently complete, it is withdrawn, filter pressed, and the caustic soda or other alkaline solution returned to the crushing plant. The filter pressed ore is then, with, or without washing, extracted with cyanide solution by the well known cyanide process, or is otherwise treated with a suitable solvent, the gold or silver being precipitated by zinc in the usual way.

C Butters Prov. Division.

(39)

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:-

1. The process of treating refractory gold and silver ores consisting in subjecting the ores to the action of caustic alkali in the presence of a suitable metal for example metallic aluminium or an alloy of same substantially as and for the purpose described.

2. The process of treating refractory gold and silver ores as claimed in the preceding claim in which the caustic alkali is in weak solution and the metallic contact is effected with agitation substantially as and for the purpose described.

3. The process of treating refractory gold and silver ores as claimed in Claim 1, in which electrolytic decomposition of such ores is effected by the use of an anode of a metal for example aluminium or of an alloy of same and an electrolyte of a solution of caustic alkali substantially as and for the purpose described.

4. The combined process of treating refractory gold and silver ores consisting in the steps claimed in any of the preceding claims together with the subjection of the residue after the separation of the alkali solution to the action of a suitable solvent to extract the precious metal.

3. The Applicant therefore applies for Leave to file a Specification of the invention pursuant to Part I of The Mysore Inventions and Designs Regulation, 1894.

Dated this tenth day of October, 1912.

Sgn'd Charles Butters

I, Charles Butters, the Applicant above named, do declare that what is stated in this Application is true to my knowledge, except as to matters stated on information and belief, and as to those matters I declare them to be true.

Sgn'd Charles Butters

Enclosure to Ltr

I certify this to be a true copy

10 SEP 1913

Acting for Comptroller.

40

1

N°. 18,660

A.D. 1912

Date of Application, No. 18,660, 14th Aug., 1912
,, ,, No. 18,661, 14th Aug., 1912
Complete Specification Left, 13th Mar., 1913
(Section 16 of the Patents and Designs Act, 1907.)
Complete Specification Accepted, 14th Aug., 1913

PROVISIONAL SPECIFICATION.

No. 18,660, A.D. 1912.

Improvements in the Treatment of Refractory Gold and Silver Ores.

I, CHARLES BUTTERS, of 54, New Broad Street, London, E.C., Metallurgist, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in the treatment of refractory gold and silver ores.

The object of the invention is the preliminary treatment of refractory gold and silver ores to render them readily amenable to subsequent treatment by cyanide solutions or by any other processes for extraction of the precious metals thereof. As a result of the process in question, a higher extraction is obtained, time is saved, and so is also the cyanide or other solvent which may be employed in the final recovery of the precious metal.

It has been found by experiments that when sulphide gold or silver ores, tellurides and similar ores, associated with, or not associated with arsenic antimony, and the like, are brought into intimate contact, such as by agitation, or otherwise, with certain metals in any convenient form, but preferably metallic surfaces, in the presence of caustic soda or other caustic alkalies, either hot or cold, such ores are decomposed, and the metallic gold and silver are freed from combination with the sulphur or the like and are then in a condition to be readily attacked and dissolved by potassium cyanide or other suitable solvents.

The metals which appear to give the best results are aluminium, zinc, tin, and palladium, but the invention is not confined to these particular metals as other metals may be used which react under the conditions specified.

A convenient way of carrying out the invention is to agitate an extremely finely ground ore mixed with sufficient caustic soda solution to form a pulp in vessels lined with aluminium blocks or plates, moving arms, beaters or the like, also of metallic aluminium being employed for agitating the pulp.

When the ore is decomposed it may be separated from the caustic soda by filter pressing or otherwise and the gold and silver which by the action of the process is now only mechanically combined with the residue extracted and recovered from such residue by any suitable means.

Dated this 14th day of August, 1912.

PHILIP M. JUSTICE,
55 & 56, Chancery Lane, London,
Chartered Patent Agent,
For the Applicant.

[*Price 8d.*]

PROVISIONAL SPECIFICATION.

No. 18,661, A.D. 1912.

Improvements in the Treatment of Refractory Gold and Silver Ores.

I, CHARLES BUTTERS, of 54, New Broad Street, London, E.C., Metallurgist, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in the recovery of gold and silver from refractory ores.

The object of the invention is to so treat gold and silver ores that the extraction is increased, time is saved, and so is also the cyanide or other solvent which may be employed in the final recovery of the precious metal.

The invention is based on a reaction which it has been found occurs when sulphide gold and silver ores, tellurides, and similar ores associated with, or not associated with arsenic, antimony, and the like are brought into intimate contact such as by agitation or otherwise with certain metals such for example as aluminium, zinc, tin, or palladium, in any convenient form, but preferably as metallic surfaces, in the presence of caustic soda or other caustic alkalies, either hot or cold, which results in such ores being decomposed and the metallic gold and silver being freed from combination with the sulphur or the like, whereby they are in condition to be readily attacked or dissolved by potassium cyanide or other suitable solvents.

According to the invention, the ore is first finely crushed or ground in the presence of a solution of caustic soda or other caustic alkali and the solution with the ore is then run into tanks from which firstly the excess of the solution may be decanted. The ore with sufficient solution to form a thick pulp is then agitated in such tank, or it may be in a separate tank if the first is not provided with an agitator. Such agitating tank may be lined with one of the metals referred to, say aluminium or it may contain or carry blocks or plates of the metal, the agitating element being also preferably of the same metal, *viz.*: aluminium. From time to time the pulp is sampled and when decomposition is sufficiently complete, it is withdrawn, filterpressed and the caustic soda or like alkaline solution returned to the crushing plant. The filterpressed ore is then with or without washing extracted with cyanide solution by the well-known cyanide process, or is otherwise treated with a suitable solvent, the gold or silver being precipitated by zinc in the usual way.

Dated this 14th day of August, 1912.

PHILIP M. JUSTICE,
55 & 56, Chancery Lane, London,
Chartered Patent Agent,
For the Applicant.

COMPLETE SPECIFICATION.

Improvements in the Treatment of Refractory Gold and Silver Ores.

I, CHARLES BUTTERS, of 54, New Broad Street, London, E.C., Metallurgist, do hereby declare the nature of this invention and in what manner the same is

to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in the treatment of refractory gold and silver ores.

The object of the invention is the decomposition of the metallic compounds of gold and silver in the ores by the reaction on them of caustic alkali when the ore is in contact with a certain metal for instance metallic aluminium or an alloy of same, so that the valuable metals are left in such a physical condition that later on they may be dissolved by a dilute solution of cyanide of potassium or other suitable solvents.

Of the other metals than aluminium, zinc tin and palladium may be mentioned.

It has been found that if sulphide, telluride, or arsenide gold and silver ores whether associated or not associated with antimony and the like, are acted on as hereinafter described by an electric current in the presence of caustic soda or other caustic alkalies, such ores are decomposed, and the metallic gold and silver are freed from combination with the sulphur, arsenic, or the like, and are then in a condition to be readily attacked by the desired solvents.

It will be appreciated from the above and from the description following, of a manner of carrying out the invention, that it differs from suggestions for the treatment of ground telluride and like ores where no electrolytic decomposition by metallic contact is present, as in this case but where the solvent action of a relatively strong caustic alkali solution is employed with a separate precipitation of tellurium from the filtrate by protochloride of tin, or where only the ore is treated to the solvent action of polysulphides of the alkalies under heat and pressure, or where again the recovery of antimony from ores is effected by the solvent action of a relatively strong caustic alkali solution, aluminium being used in a secondary process for recovering the antimony from the solution of the first process, but such aluminium not being present in the ore pulp simultaneously to effect electrolytic decomposition. It also differs from known processes of precipitating precious metals from cyanide solutions by aluminium in the presence of free alkalies or earthy alkalies, or the precipitation of precious metals by aluminium from sulphurized solutions containing free alkali that is to say solutions containing gold in the form of sulphuret or hyposulphide of gold, the present invention not dealing in the first instance with solutions of precious metals but with the ores of such metals.

It is believed that the most economical and satisfactory method of utilizing the present invention is to agitate an extremely finely ground ore of the character referred to, made into a pulp with water in which a sufficient amount of caustic soda or other caustic alkali has been dissolved to form a suitable electrolyte: in vessels containing blocks plates or the like of aluminium or alloys of aluminium or formed of or lined with same. Under these conditions an electrical current is set up between the aluminium and one it is desired to decompose, the aluminium acting as the anode and the said ore as the cathode, which latter, probably principally through the agency of nascent hydrogen, is then split up into its component parts, and the precious metals left free to be acted on by cyanide or other suitable solvents.

If desired an independent cathode, separate and distinct from the ore may be used, of some metal other than aluminium, for instance iron. In this case contact between the independent cathode and the aluminium within the electrolyte is avoided, but the aluminium and independent cathode are connected outside the electrolyte by means of a connecting wire or other suitable device. In this case an electric current will flow from the aluminium to the iron within the electrolyte and any particles of the aforesaid refractory minerals which may be in contact with the iron plate will be split up in the same manner as they are when such minerals are themselves used as cathodes. In practice, however, I

find it more convenient to make such mineral particles themselves constitute the cathode of the electrolyte couple.

Of the base constituents of the ore, in the case of sulphur a soluble sulphide is formed, but in most of the other instances, for example arsenic and antimony, the caustic solution used is so weak that only very small amounts are capable of being dissolved during the short time of contact. In any case it is immaterial to this process whether such base constituents combine with or dissolve in the electrolyte or whether they remain mingled with the ore in the elemental state, the only point of importance being to separate them from the precious metals, which in fact occurs as the result of this process.

The following equations will serve as examples to illustrate the reactions involved in this process:

A. Argentite (Ag_2S)

$$3Ag_2S + 2Al + 4NaOH = Na_2Al_2O_4 + Na_2S + 2H_2S + 6Ag.$$

Of course, since there is always an excess of caustic alkali present, the H_2S is immediately transformed into sodium sulphide as follows:—

$$H_2S + 2NaOH = Na_2S + 2H_2O$$

B. Proustite (Ag_3AsS_3)

$$Ag_3AsS_3 + 2Al + 4NaOH = Na_2Al_2O_4 + 2H_2S + Na_2S + 3Ag + As$$

In this case some of the arsenic goes into solution in the excess of caustic alkali, but most of this will be precipitated out again by the aluminium if the treatment is continued long enough. For purposes of the subsequent cyanide treatment it is immaterial which of the two courses is followed by the arsenic.

C. Pyrargyrite (Ag_3SbS_3)

$$Ag_3SbS_3 + 2Al + 4NaOH = Na_2Al_2O_4 + 2H_2S + Na_2S + 3Ag + Sb$$

The same remark will hold good here as applies above in the case of arsenic.

D. Gold telluride, say ($AuTe_2$)

$$AuTe_2 + 2Al + 4NaOH = Na_2Al_2O_4 + Na_2Te + 2H_2Te + Au.$$

A convenient way of carrying out the invention is to mix to a fluid pulp the finely ground ore with a caustic soda solution of say about three-tenths *per cent.* (say 0.3%) strength and pass the same continuously at a suitable rate of speed through a revolving cylinder or similar device containing a suitable quantity of metallic aluminium, or alloy of aluminium, in the form of blocks, plates or granules, the pulp after passing through the said cylinder being collected in a tank or other receptacle in which blocks or plates of metallic aluminium are placed in such a way as to give the best contact between their surfaces and the pulp, agitation being maintained in this tank until the refractory minerals are sufficiently decomposed for purposes of the subsequent treatment for extraction of the precious metals.

In some cases the passing of the pulp through the cylinder may be found sufficient without the further contact in the tank, and in others the tank treatment alone may be given.

The presence of the metallic aluminium at the time the ore is being acted on by the caustic soda, results, as I have found by experiment, in permitting the use of soda solution of much less strength than it is possible to use with the aluminium absent, because of the electrolytic decomposition effected in the presence of the aluminium. This is of great importance in that the regeneration of the soda solution after the decomposition of the ores under certain circumstances may be expensive. With the weak solution the use of which is rendered possible by this process, such solution may be allowed to waste. Furthermore by my process, I am enabled to work at atmospheric temperatures and pressures.

When the minerals are sufficiently decomposed which may be ascertained by sampling the ore may be withdrawn from the tank or cylinder and separated

from the caustic soda solution by filter-pressing or otherwise, with or without washing of the cake, and the gold and silver, which by the action of the process is now only mechanically held in the residue, extracted and recovered from such residue by any suitable means, such as by treatment by the well known cyanide process to extract the gold and silver which may be then recovered from the solution in any desired way.

Having now particularly described and ascertained the nature of this said invention and in what manner the same is to be performed, I declare that what I claim is;—

1. The process of treating refractory gold and silver ores consisting in subjecting the ores to the action of caustic alkali in the presence of a suitable metal for example metallic aluminium or an alloy of same substantially as and for the purpose described.

2. The process of treating refractory gold and silver ores as claimed in the preceding claim in which the caustic alkali is in weak solution and the metallic contact is effected with agitation substantially as and for the purpose described.

3. The process of treating refractory gold and silver ores as claimed in Claim 1, in which electrolytic decomposition of such ores is effected by the use of an anode of a metal for example aluminium or of an alloy of same and an electrolyte of a solution of caustic alkali substantially as and for the purpose described.

4. The combined process of treating refractory gold and silver ores consisting in the steps claimed in any of the preceding claims together with the subjection of the residue after the separation of the alkali solution to the action of a suitable solvent to extract the precious metal.

Dated the 13th day of March, 1913.

PHILIP M. JUSTICE,
Chartered Patent Agent,
55 & 56, Chancery Lane, London,
For the Applicant.

Exd

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1913.

2.4.1

41

No. G-5653

Rec. 21-12-14

GOVERNMENT OF MYSORE

General Department.

Register No. 2 **of 1902-13**

Bangalore, the 24th January *1904.*

WHEREAS an application, dated the 10th October 1912 and received on the 2nd December 1912 has been submitted under Section 5 of the Mysore Inventions and Designs Regulation, 1894, by Mr. Charles Butters of 54, New Broad Street, London, England, metallurgist

(hereinafter referred to as "the applicant") for leave to file a specification of an invention for "Improvements in the Treatment of Refractory Gold and Silver Ores"

And whereas the applicant has duly complied with all the requirements of Section 5 of the said Regulation;

The Government of Mysore are pleased, under Section 6 of the said Regulation, to authorize the applicant to file a specification of the said invention in accordance with the provisions of the said Regulation.

ORDERED, that the applicant be, and he is hereby, informed accordingly.

By Order of the Government of Mysore,

for Secretary to the Govt. of Mysore,
Gen. and Rev. Depts.

Certified that the fees prescribed in the fourth schedule to the Mysore Inventions and Designs Regulation, 1894, in respect of the application for leave to file the said specification and of the filing thereof have been paid by the applicant, and that the specification hereinbefore described has been duly filed in accordance with the provisions of Section 8 of the said Regulation on this the 30th Thirtieth day of January 1904.

for Secretary to the Govt. of Mysore,
Gen. and Rev. Depts.

(Section 8 of the Inventions and Designs Regulation, 1894.)

8. (1) If within six months from the date of an order under Section 6, Sub-Section (1), or within such further time, not exceeding three months, as the Government of Mysore, in its discretion, may, on cause shown to its satisfaction and on payment of the fee prescribed in that behalf in the fourth schedule, see fit to allow, the applicant causes a specification of his invention to be filed in manner by this Part required, and the fee prescribed in the fourth schedule in respect of the filing of the specification to be paid, the applicant shall, subject to the other provisions of this Part, be entitled to the exclusive privilege of making, selling and using the invention in the Territories of Mysore, and of authorizing others so to do, for a term of fourteen years from the date of the filing of the specification.

(2) But an exclusive privilege in respect of an invention of a new manufacture shall, notwithstanding anything in Sub-Section (1), cease, if the inventor fails to pay, within the time limited in that behalf by the fourth schedule, any fee prescribed in that schedule in respect of the continuance of the privilege.

(3) If, nevertheless, in any case, by accident, mistake, or inadvertence, an inventor fails to pay any such fee within the time so limited, he may apply to the Government of Mysore for an enlargement of the time for making the payment.

(4) Thereupon the Government of Mysore may enlarge the time accordingly, on payment of the fee prescribed in that behalf in the fourth schedule, and subject to the following conditions, namely :—

(*a*) the time for making a payment shall not in any case be enlarged for more than three months ; and

(*b*) if any suit is instituted in respect of an infringement of the exclusive privilege committed after a failure to make a payment within the time limited for the making thereof and before the enlargement of that time, the Court disposing of the suit may, if it thinks fit, refuse to award or give any damages in respect of the infringement.

GPE—500—7-4-09.

(42)

G. R. S. 26]

File No. 216-12

Serial No. 15

Diary No. of letter replied to 4145

No. G 5654

General and Revenue Secretariat

( )

, *the* 191

To

Messrs Remfry & Son,

Solicitors and Patent Agents,

Calcutta.

Date of issue 24. 1. 14

Signed by W. H. Nelson Rees

Gentlemen,

With reference to correspondence ending with your letter No. dated the 2nd October 1913, I am directed to forward herewith G. O. No. G 5653 GM 216-12- dated January 1914, authorizing Mr. Charles Butters of 54, New Broad Street, London, England, Metallurgist, to file an amended specification of his invention for "Improvements

over.

SUBJECT.

in the Treatment of Refractory Gold and Silver Ores" and I request that the same may be communicated to the party concerned.

I have &c,

WR

For Secretary.

List of enclosures,

Copied by

Examined by

GPB—25,000—5-8-11.

DIARY No. 5363

Re 16

GENERAL.

1913-1914

SECTION Gen : Mis

FILE No. 216 of 1912-13

49

REGISTERED.

To

THE ~~PATENT~~ SECRETARY, TO THE GOVERNMENT OF MYSORE,
~~PATENT OFFICE,~~ GENL. & REV. DEPTS.,
~~CALCUTTA~~ BANGALORE,
MYSORE.

V 30/1 pm

FROM

REMFRY & SON,
SOLICITORS AND PATENT AGENTS,
CALCUTTA.

Dated CALCUTTA, the 27th January 1914.

Sir,

Dupt. P. File Ln. M.
FILE INDICATION.
Mysore Pats.

re C. BUTTERS. (MYSORE).
No. 2 of 1912-13.

Pursuant to the Order granting leave in this matter dated 24th January 1914, Register No. 2 of 1912-13, we have the honour to forward herewith 4 copies of the Specification of CHARLES BUTTERS, of 54 New Broad Street, London, England, Metallurgist, in respect of his Invention for "IMPROVEMENTS IN THE TREATMENT OF REFRACTORY GOLD AND SILVER ORES".

The abovementioned Order is enclosed and we solicit the favour of your filling in the Certificate at foot thereof and having same signed.

A Post Office Order for Rs. 30/- is sent today.

We have the honour to name our Office in Calcutta as the Address for Service under the Act.

We have the honour to be,

Sir,

Your very obedient servants,

Enclos.
4 Specns.
Order.

I.M.B.

1,000.—17-3-11.

D

45

Remittance may write here any communication to the payee.

30 As. 0 re C.BUTTERS. (MYSORE)

Rec'd 31/- No. 2 of 1912-13. Remittance

30.1.14 (As per letter of date).

29/1/14

Lo/Bo 2

31/1

21/2

MYSORE GOVT. GEN. & REV. SECRETARIAT.

No. G [illegible]
Gen. 216-18-17

Dated Bangalore, 28/21 14 1890

NOTIFICATION

(PATENT.)

The following specification of an invention has been filed in accordance with Sections 8, 9, 10 and 11 of Regulation XI of 1894 (The Inventions and Designs Regulations) and is open to inspection at the Mysore Government Secretariat on application to the Secretary to the Government of His Highness the Maharaja of Mysore, General and Revenue Departments, and on payment of a fee of one Rupee.

By Mr. Charles Butters, of 54 New Broad Street, London, England, Metallurgist.

"Improvements in the treatment of Refractory Gold and Silver Ores"

By Order,

for Secretary.

To

The Compiler, *Mysore Gazette*, for publication.

47

No. C 6668.
Com. 216-12/18

MYSORE GOVT. GEN. & REV. SECRETARIAT,
Dated Bangalore, 28/2/1914

From

The Secretary to the Government of H. H. the Maharaja of Mysore.
General and Revenue Departments.

To

Messrs. Remfry & Son,
Solicitors & Patent Agents
Calcutta

~~Sir~~, Gentlemen

With reference to your letter dated the 27th January 1914 I am directed to forward copy of a Notification No. C6667/8m 216-12-7 dated 28th February 1914 issued by this Government in regard to the invention filed by you under Regulation XI of 1894 (The Inventions and Designs Regulations.) and request that the same maybe communicated to the party concerned.

The order granting permission to file specification is herewith returned, with the certificate at foot, duly filled in and signed.

I have the honor to be,
Sir,
Your most obedient servant,

Dft)

for Secretary

CS 14/2

Statement & cover in
III
21/2
2 Rs Treasury Deptt

G.R.S. 29A]

4885

48

19

From

Secy. to the Govt. of His Highness
The Maharaja of Mysore,
Genl. and Rev. Dept.

To

The Deputy Commissioner,
Treasury Deptt, Bangalore Dt

Dated
Despatched } 20/2/14
Received

General No. G 6669
Cur No. 216-12-19
Enclosure No. Rs 30/-

Has the honr to forward herewith a sum of Rs 30/- (Thirty only) received from Messrs Remfry & Co., Calcutta, being the fee payable under cl (2) of Schedule IV of the Mysore Inventions and Designs Regulation No XI of 1894, for filing a specification of an invention for "Improvements in the treatment of Refractory Gold and Silver Ores" by Mr Charles Butters of 54 New Broad Street, London, and to request the favr of an acknowledgment for the receipt of the amount.

By Order,

For Secretary to Govt

30/1/14

GPB—20,000—24-10-16.

G.R.S. 29A]

19

From

Secy. to the Govt. of His Highness
The Maharaja of Mysore,
Genl. and Rev. Dept.

To
(1) The State Geologist in Mysore.
(2) " Supdt, Govt Museum.
(3) " Chief Engineer of Mysore.

Dated

Despatched 3 20/2/14

Received

General No. G 6670-2

Rev No. 216-13-20

Enclosure No. one

Has the honor to forward herewith for record in his office, copy of a specification of an invention for "Improvements in the treatment of Refractory Gold and Silver Ores" by Mr. Charles Butters of 54 New Broad Street, London, and Requests the favor of an acknowledgment.

By Order,

For Secretary to Govt

GPB—20,000—21-10-16.

JARY NO. 6035

13-1-14

Secn: Mis

File No. 216 of 1912-13

Item No. 21

50

Rs 30-0

Book No. 1043 No. 68

Bangalore District Treasury dated 21st February 1914

Received from The Secretary, Genl & Rev. Offs - Bangalore

Rupees Thirty only

Annas _____ and Pies _____ being on account of

Fees received from Messrs Remfry & Son. Calcutta for filing a Specification of an invention for Improvements in the treatment of Refractory Gold & Silver Ores. received with his docket no: 6669 dated 20.2.14

216-13-14

H. Narasimhaiah
In charge of Treasury.
Bangalore

Noted and ordered.

K. V. [illegible]

25/2

(5)

No. 142.

OFFICE OF ECONOMIC BOTANIST,
SUPERINTENDENT, MYSORE GOVERNMENT MUSEUM,
Bangalore, dated 24-13 February 1914.

FROM

G. H. KRUMBIEGEL, ESQ., F.R.H.S.,
Economic Botanist,
Superintendent, Mysore Govt. Museum,
Bangalore.

DIARY NO. 6141
1913-1914
SECTION Jen: Mis
FILE No. 216 of 1912-13
ITEM No. 22

To

The Secretary to the Govt. of H. H.
the Maharaja of Mysore.
Genl. and Rev. Departments

Sir,

I have the honor to acknowledge
receipt of copy of a specification of an
invention for "Improvements in the treatmen
of refractory Gold and Silver ores" by Mr.
Charles Butters of New Broad Street. London,
forwarded with your docket No. G. 6670-2
G. M. 216-13-20, dated 20th February 1914.

I have the honor to be,
Sir,
your most obedient servant,
G. H. Krumbiegel
Superintendent.
Govt. Museum.

Bm

From

1913-14

G. H. KRUMBIEGEL, Esq., F.R.H.S.,
Economic Botanist,
Supt., Mysore Govt. Museum,
Bangalore.

To

The Secretary to the Govt.
of H.H. the Maharaja of Mysore
Genl and Rev. Depts.

Dated 24th February 1914

Despatched 25th

Received

General No.

No.

Enclosure No.

Acknowledging
receipt of Copy of a
specification of an
invention for "Improvements
in the treatment of refractory
and gold and silver ores"
by Mr. C. Butters.

GPB—5,76,000—6-4-12

V.
27/1/14

M.G.D. 13]

GPB—1,000—13-2-14

52

MYSORE GEOLOGICAL DEPARTMENT.

DATED BANGALORE,....26-2-.....1914

No. 1973.

DIARY No....6186

13-1914
SECTION Gen: Mis
FILE No. 216 of 1912-13
No. 23

FROM.

DR. W. F. SMEETH, M.A., D.SC., A.R.S.M., etc.,
State Geologist in Mysore.

To

K.R. Srinivasiengar, Esquire, M.A.,
Secretary to the Government of His Highness
the Maharaja of Mysore, Gen. & Rev. Depts.

SIR,

I have the honour to acknowledge the receipt of a copy of a specification of an invention for "Improvements in the treatment of refractory Gold and Silver ores" by Mr. Charles Butters of 54, New Broad Street, London, forwarded with your docket No.G.6670-2/G.M.216-13-20, dated 20th February 1914.

I have the honour to be,
Sir,
Your most obedient servant,

Registrar

C.N.

State Geologist in Mysore.
W.

(53)

DIARY No. 62/11

REMFRY & SON,
SOLICITORS, NOTARIES & PATENT AGENTS.

FIRM FOUNDED 1827. PATENT DEPT. ESTBD. 1859.

TELEGRAPHIC ADDRESSES:
GENERAL: "REMFRYS, CALCUTTA."
PATENT DEPT.: "PATENTABLE, CALCUTTA."
CODES: A. B. C. CODE (5TH EDN.) WESTERN UNION TEL. CODE. PATENT CODE.

Patent Department.
1913-1914
SECTION Gen: Mis
FOREIGN MEMBERS.
CHARTERED INSTITUTE OF PATENT AGENTS.
AUSTRALASIAN INSTITUTE OF PATENT ATTORNEYS.
TELEPHONE NO. 593.
No. 5 1024 1912-13
24

PLEASE ADDRESS POST BOX NO. 161.
8, Hastings Street,
Calcutta, 25th Feby 1914.

DEPT. P. FILE LR. M.
FILE INDICATION.
Mysore Pats.

To
THE SECY TO THE GOVT OF MYSORE,
Genl & Rev. Depts.
Bangalore,
Mysore

V 1/3 24

DEAR SIR

re C.BUTTERS. (MYSORE)

No.2/12-13 dated -
No.G6668/G.M. 216-13-18.

Your favour of 20/2/14 in the above matter is duly to hand with copy of Notification of filing of Specifications herein.

If any action is required in this matter, you will understand from this acknowledgment that we are taking such action and will, if necessary, write to you further regarding same.

Yours faithfully,
REMFRY & SON,
per

Acknowledgment
Ackt.

REMARKS

We beg to point out that the Order said to be returned with Certificate at foot filled up and signed has not come to hand and to request that such Order be forwarded to us as early as possible.

A.M.

IN ALL LETTERS REGARDING THIS MATTER, WE SHALL BE MUCH OBLIGED BY YOUR USING THIS HEADING AND NOT INCLUDING OTHER MATTERS IN SUCH LETTERS.
[PLEASE ADDRESS CORRESPONDENCE TO:— REMFRY & SON (PATENT DEPT.), POST BOX NO. 161, CALCUTTA.]

PLEASE QUOTE REQUEST IN THE MARGIN.

Ltr. (Ackt.)—1,000—14-5-13. [500—5-9-12].

G. R. S. 26]

1713

Diary No. of letter replied to 627/

General and Revenue Secretariat

( )

, *the* 191 .

Date of issue 20/3/14

Signed by Dr. T. R. L. Rao

Gm File No. 216-12

Serial No. 28

X

No. G 7689/21.

To

Messrs Remfry & Son,

Solicitors & Patent Agents,

Calcutta.

Gentlemen,

As requested in your letter of the 25th February 1914, I am directed to return herewith G.O. No. G 5653 dated the 24th Jan'y 1914, Gm 216-12-14 granting permission to Mr. Charles Butters of London to file specification of his invention for "Improvements in the treatment of refractory gold and silver ores"

over.

Copied 6/3

SUBJECT.

with the certificate at foot duly filled in and signed.

I have &c,

For Secretary of State

List of enclosures.

Copied by

Examined by

GPB—25,000—8-8-11.

(56)

Mysore Public Works Department,

No. 400/2270 Central Office,

Bangalore, Dated 9th March 1914.

DIARY No. 6584

From

K.Krishnaiengar, Esq., B.A., L C.E., 1913-1914

Offg: Secretary to Government

Public Works Department, Bangalore.

To

K.R.Srinivasaiengar Esq., M.A.,

Secretary to the Government of Mysore,

General and Revenue Departments, Bangalore.

Sir,

I have the honour to acknowledge the receipt of a copy of specification of an invention for " Improvements in the treatment of refractory Gold and Silver Ores ", by Mr.Charles Butters, London, forwarded with your No.G.6670-2/G.M.216-13-20 dated the 20th February 1914.

I have the honour to be,

S i r,

Your most obedient servant,

K. Krishnaiengar

Offg: Secretary to Government,

Public Works Department.

V.S.P.